

PATENT COOPERATION TREATY

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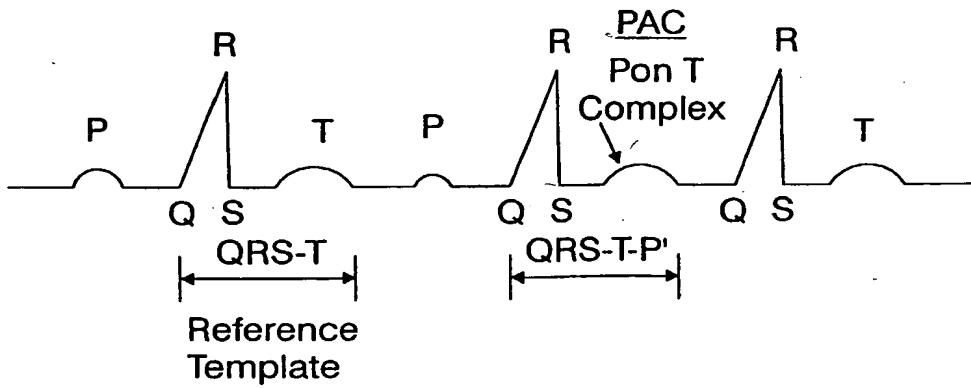
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— with international search report

[Continued on next page]

(54) Title: TRACKING ECTOPIC BEATS OR DERIVING P-WAVES IN ELECTROCARDIAC SIGNALS HAVING SUPERIMPOSED COMPLEXES



**WO 02/058550 A3**

(57) Abstract: A system and compressor for tracking ectopic beats is disclosed wherein ECG data from multiple leads is acquired and a segment of said ECG signal is used as a reference template. The best fit between the reference template and the acquired data is determined using a correlation coefficient calculation. There is also disclosed a system and a processor for deriving a p-wave signal from a premature atrial contraction (PAC) beat in an ECG signal wherein ECG data is captured and processed so as to derive the p-wave signal from the PAC beat, thereby obtaining information on the p-wave in an ECG signal wherein the complexes partly overlap and obscure parts of the waveform.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/46348

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A61B5/0452 A61B5/0468 G06F17/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 A61B G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, INSPEC, COMPENDEX

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	THRONE R D ET AL: "Use of tachycardia templates for recognition of recurrent monomorphic ventricular tachycardia". PROC. COMPUTERS IN CARDIOLOGY MEETING. JERUSALEM, SEPT. 19 - 22, 1989, WASHINGTON, IEEE COMP. SOC. PRESS, US, 19 September 1989 (1989-09-19), pages 171-174, XP010022102 ISBN: 0-8186-2114-1 cited in the application the whole document	1-3,31, 32,34-39
Y	---	6,42 -/-

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

## ° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 01/46348

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3.  Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/46348

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 9102484	A	07-03-1991	US	5020540 A		04-06-1991
			AT	173551 T		15-12-1998
			AU	653318 B2		29-09-1994
			AU	5280190 A		03-04-1991
			CA	2064791 A1		23-02-1991
			DE	69032771 D1		24-12-1998
			DE	69032771 T2		29-07-1999
			EP	0489010 A1		10-06-1992
			JP	5500167 T		21-01-1993
			JP	3138752 B2		26-02-2001
			WO	9102484 A1		07-03-1991
-----						
WO 0167950	A	20-09-2001	AU	5386101 A		24-09-2001
			WO	0167950 A1		20-09-2001
			US	2001056245 A1		27-12-2001
			AU	4576701 A		24-09-2001
			AU	4744001 A		24-09-2001
			AU	4920601 A		24-09-2001
			WO	0167954 A1		20-09-2001
			WO	0167953 A1		20-09-2001
			US	2001056289 A1		27-12-2001
			US	2002038093 A1		28-03-2002
			AU	5705201 A		23-10-2001
			WO	0176461 A2		18-10-2001
			US	2002026220 A1		28-02-2002
-----						
US 5772604	A	30-06-1998	AU	6551498 A		12-10-1998
			US	6064906 A		16-05-2000
			WO	9841144 A1		24-09-1998
-----						
US 5840038	A	24-11-1998	NONE			
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